

Pocket Guide to Mid-Atlantic Water Garden Species

**Featuring Invasive Species and
Their Native Alternatives**



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How to Use This Guide

The information is intended as a portable guide to accompany you to the garden center. It is intended to help gardeners select native alternatives and avoid plants likely to escape and cause problems. Native plants can provide an attractive setting and will support native wildlife whose presence will enhance the water feature.

The plants suggested are known to be native in Pennsylvania and the Mid-Atlantic region. They are suggestions only and there are other plants you can select that may better suit your garden site. Before selecting plants for your water garden, or any landscaping project, research the plants you want to use to be sure they suit the site and meet your aesthetic criteria. Visit the Habittatitude™ website for invasive species information specific to water gardens and aquaria.

A water garden is fundamentally an outdoor aquarium.

The gardener needs to manage the pH, nutrients, and organisms introduced into the system. Just because a plant or animal is invasive doesn't mean it can't be ordered and delivered to your door or purchased locally. Unwelcome hitchhikers may also accompany your purchase. Plants and animals known to be invasive or prohibited in the state are often part of plant orders in the water or plant medium or used for packing.

To Prevent Introducing Hitchhikers:

- Rinse plants in a light colored bucket of clear tap water until clean
- Dispose of any packing materials or water only after disinfection

Watch for animals or other plant fragments. If it seems likely that the plant has hitchhikers, you can clean emergent types of plants such as arrowhead (*Sagittaria* spp.). Dip the plant in a 10% chlorine solution, swish it around and shake it off. Rinse in tap water after 30 seconds. This should not be used on submerged plants like Elodea (*Elodea canadensis*).

Any hardy non-native plant or animal species may become the next problematic invasive species that can clog our waterways and damage wildlife habitat. In addition, many closely related (same genus) plants can hybridize with the native species, often passing on aggressive traits. Our suggestion is to use native plants whenever possible.

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When selecting plants, consider using species native to the region or non-invasive exotic plants. Never use any invasive plant unless it is well outside its hardiness zone, and even then with caution. The USDA plant hardiness zone map is the standard by which gardeners can determine which plants are most likely to thrive at a location.

Pennsylvania ranges in hardiness zones from 5a in north central to 7b in southeastern and southwestern regions. Choose a reputable nursery, ask if the vendor is aware of regional or federal restrictions and verify the scientific names are correct. Common names may be used for several different species, not all of which are harmless.

Note on snails and fish:

Snails, by their nature, are generally easily moved or move themselves under moist conditions. They are often intermediate hosts for parasites. Snails have a large appetite for vegetation that we don't necessarily want eaten. For this reason their use in water gardens is not recommended. Fish are sometimes added to water gardens for visual interest. Keep in mind that they will add nutrients to the system that you will have to remove with filters or balance using plants. The fish commonly used in water gardens are goldfish and koi, both of which are carp from Asia. They should never be released or allowed to escape into local waters. They consume aquatic plants and can make the water cloudy as they feed. Carp will also grow quite large, sometimes outgrowing their space.

“If you build it, they will come...”

Fish may also be an attractant to birds that consider expensive koi a tasty snack and can move those snails on plant material or in their digestive systems. Local amphibians such as frogs, toads or salamanders may decide your water garden is a good place to reproduce or hang out. Fish are competitors that eat their eggs. Local turtles may also move in to your water feature and birds and butterflies will come for a drink. Rather than investing in exotic animals, rely on the locals to move in.

¹ Federal Noxious Weed, ² Pennsylvania Noxious Weed, ³ Least Wanted in Pennsylvania

“No native genera” - no related plants native to PA. Potential invasive, exercise caution

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Invasive Plant: Flowering rush, *Butomus umbellatus*

Native Replacement: Spike rush, *Eliocharis palustris*

Notes: Hardiness zones 3 to 11

Invasive Plant:

Butomus umbellatus



Native Replacement Plant:

Eliocharis palustris



Invasive Plant: Brazilian waterweed, Anacharis, *Egeria densa*

Native Replacement: *Elodea canadensis*

Notes: Hardiness zones 4 to 11

Invasive Plant:

Egeria densa



Native Replacement Plant:

Elodea canadensis



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Invasive Plant: Water hyacinth, *Eichhornia crassipes*

Native Replacement: Spatterdock, *Nuphar lutea*

Notes: Zones 9 to 11, spreads through seeds, fragmentation

Invasive Plant:

Eichhornia crassipes



Native Replacement Plant:

Nuphar lutea



Invasive Plant: Anchored water hyacinth, *Eichhornia azurea*¹

Native Replacement: Spatterdock, *Nuphar lutea*

Notes: Zones 9 to 11, spreads through seeds, fragmentation

Invasive Plant:

Eichhornia azurea



Native Replacement Plant:

Nuphar lutea



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Invasive Plant: Hydrilla, Water thyme, *Hydrilla verticillata*¹
Native Replacement: Coontail, *Ceratophyllum demersum*
Notes: Zones 5 to 11, overwinters as tubers

Invasive Plant:
Hydrilla verticillata



Native Replacement Plant:
Ceratophyllum demersum



Invasive Plant: European frogbit, *Hydrocharis morsus-ranae*
Native Replacement: Fragrant water lily, *Nymphaea odorata*
Notes: Zones 5 to 9, overwinters as turions

Invasive Plant:
Hydrocharis morsus-ranae



Native Replacement Plant:
Nymphaea odorata



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Invasive Plant: Water spinach, *Ipomoea aquatica*¹
Native Replacement: Fragrant water lily, *Nymphaea odorata*
Notes: Zones 7 to 11, produces seeds, may overwinter

Invasive Plant:
Ipomoea aquatica



Native Replacement Plant:
Nymphaea odorata



Invasive Plant: Yellow flag or Pale yellow iris, *Iris pseudacorus*
Native Replacement: Blue flag iris, *Iris versicolor*
Notes: Hardiness zones 3 to 9

Invasive Plant:
Iris pseudacorus



Native Replacement Plant:
Iris versicolor



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Invasive Plant: Oxygen weed (*Elodea crispata*), *Lagarosiphon major*¹

Native Replacement: Elodea, *Elodea canadensis*

Notes: Zones 9 to 10, overwinters as tubers

Invasive Plant:

Lagarosiphon major



Native Replacement Plant:

Elodea canadensis



Invasive Plant: Peruvian primrose, *Ludwigia peruviana*

Native Replacement: Water willow, *Justicia americana*

Notes: Hardiness zones 8 to 11

Invasive Plant:

Ludwigia peruviana



Native Replacement Plant:

Justicia americana



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Invasive Plant: Purple loosestrife, *Lythrum salicaria*²

Native Replacement: Pickerelweed, *Pontederia cordata*

Notes: Zones 3 to 8, spreads through seeds, fragmentation

Invasive Plant:
Lythrum salicaria



Native Replacement Plant:
Pontederia cordata



Invasive Plant: Parrot feather, *Myriophyllum aquaticum*

Native Replacement: Coontail, *Ceratophyllum demersum*

Notes: Zones 4 to 9, spreads through seeds, fragmentation

Invasive Plant:
Myriophyllum aquaticum



Native Replacement Plant:
Ceratophyllum demersum



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Invasive Plant: Eurasian watermilfoil, *Myriophyllum spicatum*³

Native Replacement: *Elodea canadensis*

Notes: Zones 2 to 10, invasive Canada to Florida

Invasive Plant:

Myriophyllum spicatum



Native Replacement Plant:

Elodea canadensis



Invasive Plant: Yellow floating heart, *Nymphoides peltata*

Native Replacement: Spatterdock, *Nuphar lutea*

Notes: Zones 4 to 9, spreads through seeds, fragmentation

Invasive Plant:

Nymphoides peltata



Native Replacement Plant:

Nuphar lutea



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Invasive Plant: Water lettuce, *Pistia stratiotes*

Native Replacement: Floating leaf pondweed, *Potamogeton natans*

Notes: Hardiness zones 9 to 11

Invasive Plant:

Pistia stratiotes



Native Replacement Plant:

Potamogeton natans



Invasive Plant: Water chestnut, *Trapa natans*

Native Replacement: Floating-leaf pondweed, *Potamogeton natans*

Notes: Zones 5 to 11, caltrops-like seeds and turions overwinter

Invasive Plant:

Trapa natans



Native Replacement Plant:

Potamogeton natans



Pocket Guide to Mid-Atlantic Snails and Fish

Invasive Snail/Fish: Chinese Mystery Snail, *Cipangopaludina chinensis*

Native Replacement: Local snails

Notes: Nuisance in Great Lakes, intermediate host to parasites, competition with native species

Invasive Snail/Fish:
Cipangopaludina chinensis

Native Replacement:
Local snails



Invasive Snail/Fish: Japanese Mystery Snail, *Cipangopaludina japonica*

Native Replacement: Local snails

Notes: Competes with native species. **Never** release to the wild.

Invasive Snail/Fish:
Cipangopaludina japonica

Native Replacement:
Local snails



Pocket Guide to Mid-Atlantic Snails and Fish

Invasive Snail/Fish: Goldfish, *Carassius auratus*

Native Replacement: Golden shiner, *Notemigonus crysolucas*

Notes: Nuisance in Great Lakes. Compete with native species. **Never** release to the wild.

Invasive Snail/Fish:
Carassius auratus



Native Replacement:
Notemigonus crysolucas



Invasive Snail/Fish: Koi, *Cyprinus carpio*

Native Replacement: Fathead Minnow, Rosy-red Strain, *Pimephales promelas*

Notes: Competes with native species. **Never** release to the wild. Can grow to 50 lb.

Invasive Snail/Fish:
Cyprinus carpio



Native Replacement:
Pimephales promelas



Web Resources:

To find your hardiness zone:

U.S. Department of Agriculture (USDA)

<http://planthardiness.ars.usda.gov/phzmweb/>. Accessed [28 February 2012]

To check a garden addition for being native or introduced in your state:

PLANTS database (USDA): <http://plants.usda.gov/java/>.

Accessed [4 November 2011]

Nonindigenous Aquatic Species Database:

<http://nas.er.usgs.gov/default.aspx>. Accessed [4 November 2011]

U.S. National Arboretum: Invasive Plants:

<http://www.usna.usda.gov/Gardens/invasives.html>. Accessed [15 June 2011]

Rhoads AF & Block TA. 2011. *Aquatic Plants of Pennsylvania*, University of Pennsylvania Press, Philadelphia PA, 308 pp.

Rhoads AF & Block TA. 2007. *The Plants of Pennsylvania, 2nd Edition*, University of Pennsylvania Press, Philadelphia PA, 1042 pp.

Habitattitude™ : www.habitattitude.net. [Accessed 29 March 2012]

Photo Credits:

Butomus umbellatus – Flowering spikerush

RAHoward- R.A. Howard. ©Smithsonian Institution. Courtesy of Smithsonian Institution, Richard A. Howard Photograph Collection

Carassius auratus- Goldfish, Duane Raver, US Fish and Wildlife Service, Bugwood.org

Ceratophyllum demersum – Coontail, Vic Ramey, IFLAS, University of Florida

Cyprinus carpio – Koi, Stan Shebs, Wikipedia Commons

Eliocharis palustris – Spikerush, Jennifer Anderson @ USDA-NRCS PLANTS Database

Egeria densa - Brazilian egeria, Graves Lovell, Alabama Department of Conservation and Natural Resources, Bugwood.org

Eichhornia azurea - Anchored water hyacinth, Kurt Stueber, Max-Planck-Institute for Plant Breeding Research, Cologne, Bugwood.org

Eichhornia crassipes – Water hyacinth, Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Elodea canadensis – Elodea, Dana Rizzo, Penn State University

Hydrocharis morsus-ranae - Common frogbit, Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Hydrilla verticillata – Hydrilla, Chris Evans, River to River CWMA, Bugwood.org

Ipomea aquatica - Swamp morning glory, Charles T. Bryson, USDA Agricultural Research Service, Bugwood.org swamp

Iris versicolor – Blueflag iris, Jennifer Anderson @ USDA-NRCS PLANTS Database

Pocket Guide Resources and Citations

Iris pseudacorus – Yellowflag iris, Nancy Loewenstein, Auburn University, Bugwood.org

Justicia americana – Water-willow, Larry Allain @ USDA-NRCS PLANTS Database

Lagarosiphon major – Oxygen weed, Rohan Wells, National Institute of Water and Atmospheric Research, Bugwood.org

Ludwigia peruviana - Primrose-willow, Amy Ferriter, State of Idaho, Bugwood.org

Lythrum salicaria - Purple loosestrife, John D. Byrd, Mississippi State University, Bugwood.org

Myriophyllum aquaticum – Parrotfeather, John M. Randall, The Nature Conservancy, Bugwood.org

Myriophyllum spicatum – Eurasian watermilfoil, Barry Rice, sarracenia.com, Bugwood.org

Notemigonus crysoleucas – Golden shiner, Uland Thomas, NANFA.org

Nuphar lutea – Spatterdock, Bryan Swistock, Penn State University

Nymphoides peltata – Yellow floatingheart, David Cappaert, Michigan State University, Bugwood.org

Nymphaea odorata – Fragrant water lily, Joseph Dougherty, ecophotog@yahoo.com

Pistia stratiotes – Waterlettuce

Troy Evans, Great Smoky Mountains National Park, Bugwood.org

Pimephales promelas – Fathead Minnow, Rosy-red strain, Wikipedia Commons

Pontederia cordata - Pickerelweed, Pickerelweed - Robert H. Mohlenbrock @ USDA-NRCS PLANTS Database

Salvinia molesta – Giant salvinia, Larry Allain @ USDA-NRCS PLANTS Database

Trapa natans – Water-chestnut, Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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